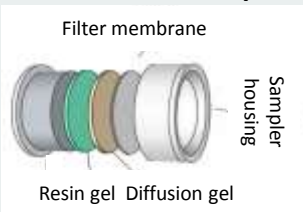


Assessing the bioavailability of metals in natural sediments by DGT passive sampling and bioaccumulation

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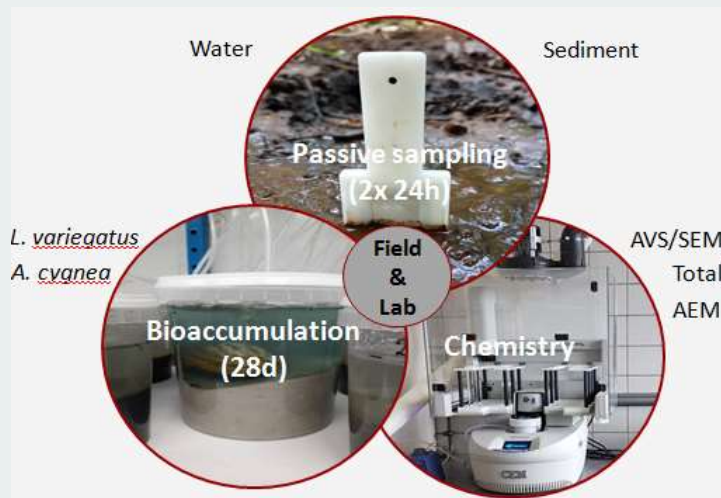
Passive sampler



- + Indication of metal flux behaviour between the different compartments **over time** and the concentration of **bioavailable** metal fractions
- + enables **non-disruptive** measurements
- Field monitoring can cause logistical problems

Research objectives: Evaluation of the use of DGT passive samplers as indicators for the bioavailability of metals for (benthic) macroinvertebrates as well as of the robustness of the results from laboratory studies under field conditions.

3 Flemish freshwater locations -> known metal background and physicochemical characteristics



Field: *L. variegatus* (n=10, 3 repl.), *A. cygnea* (n=3, 3 repl.)
 Lab: *L. variegatus* (n=10, 4 repl.), *A. cygnea* (n=1, 4 repl.)

Preliminary results: sediment composition Preliminary results: ps & bioaccumulation

- Total metal and AVS/SEM concentrations not available yet

• AEM

Table 1: AEM concentrations of the 3 different sites in comparison with the Flemish sediment standards by De Deckere et al. 2011 (total concentrations). Exceedances are indicated in bold.

| Location | µg/g dw | | | | | | | |
|-------------------------------|---------|----------|--------------|-------|--------|--------------|-------|---------------|
| | Mn | Fe | Ni | Cu | Zn | Cd | Pb | Cr |
| Meirenloop | 6.69 | 7643.10 | 43.28 | 22.25 | 86.25 | 3.04 | 14.84 | 26.44 |
| Scheppelijke Nete | 5.42 | 18859.42 | 1.15 | 1.85 | 616.81 | 11.87 | 10.90 | 1.30 |
| Grote calie | 8.18 | 14929.61 | 1.42 | 3.60 | 73.00 | 0.26 | 14.43 | 207.76 |
| Flemish standards mg/kg dw | | | 32 | 60 | 800 | 7.8 | 118 | 68 |

Discussion and Conclusion

- Risk of Ni, Cd and Cr indicated by AEM, **but:** DGT and bioaccumulation concentrations remained low for Cd and Cr
- Bioaccumulation in *A. cygnea* clearly lower than in *L. variegatus* for all 3 metals
- Mixed picture for metal fluxes & bioaccumulation in the field and in the lab => no clear conclusion yet

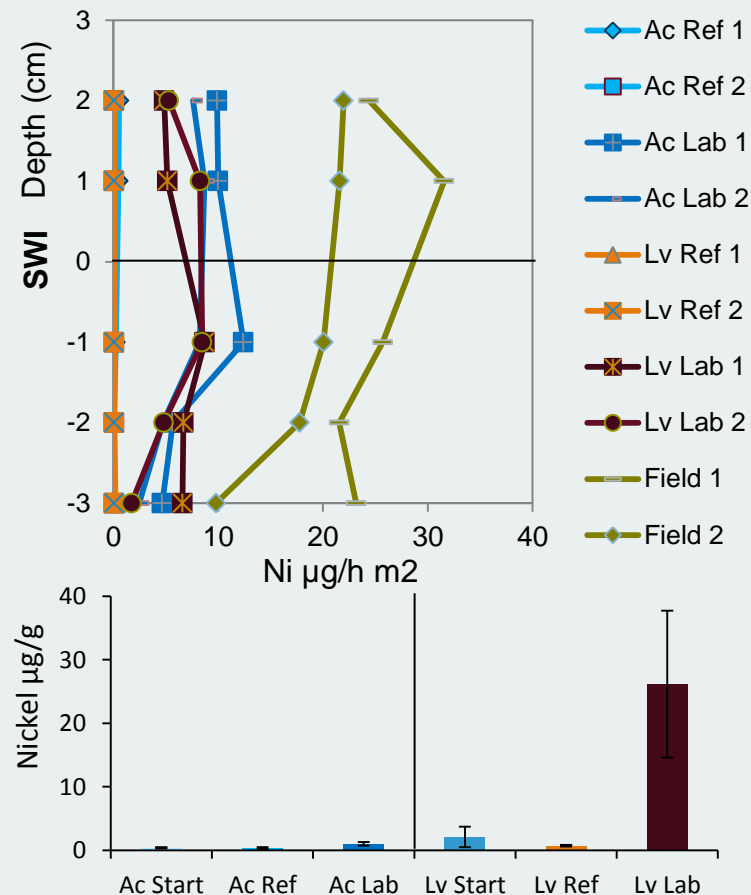


Figure 1: Flux of nickel measured by DGT ps in the field and in the lab (2 times; upper chart) in comparison with the nickel concentrations measured in the tissue of *L. variegatus* and *A. cygnea* (average and sd; lower chart).